UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,662	06/23/2005	Viatcheslav Dmitrievich Shapovalov	0065.0002US1	2898

29127 7590 10/14/2008

HOUSTON ELISEEVA
4 MILITIA DRIVE, SUITE 4
LEXINGTON, MA 02421

EXAMINER	
VELASQUEZ, VANESSA T	
ART UNIT	PAPER NUMBER
1793	
MAIL DATE	DELIVERY MODE
10/14/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/540,662	SHAPOVALOV ET AL.	
	Examiner	Art Unit	
	Vanessa Velasquez	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *37-46* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *37-46* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1-36 are canceled. Claims 37-46 are newly added. Claims 37-46 are presented for examination.

Status of Previous Objections

The previous objection to the specification is withdrawn in view of Applicant's submission of a replacement abstract.

The previous objection to claims 22 and 27 is moot in view of Applicant's cancellation of the claims.

Status of Previous Rejections under 35 USC § 112

The previous rejection of claims 10-14 under the second paragraph of 35 U.S.C. 112 is moot in view of Applicant's cancellation of the claims.

Claim Objections

Claim 1 is objected to because of a typographical error. In the phrases "one ore more of" which appear twice in the claim, the conjunction "ore" appears to be misspelled.

Claim 40 is objected to because the spelling of "sulfuric" is not consistent with the spelling of "sulphuric" in independent claim 37.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 37-39 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider et al. (US 4,834,793).

Regarding claims 37-39, Schneider et al. teach a process of extracting metal from its ore. The ore may be a sulfidic compound (col. 2, lines 53-58). In one embodiment, aqueous slurry is mixed with aqueous nitric acid in a reactor **10** containing surface agitators **20** (col. 3, lines 22-24; FIG. 1). The reaction of nitric acid and slurry produce sulfuric acid (col. 3, lines 45-50). The resulting mixture from reactor **10** is transported to vessel **40**, where $Ca(OH)_2$ is added to remove sulfate ions (SO_4^{2-}) by the precipitation of gypsum ($CaSO_4 \cdot 2H_2O$). The oxidation reaction is exothermic and may generate enough heat to increase the temperature of the reactor **10** up to 105°C (col. 4, lines 6-9), which overlaps the claimed range. The overlap between the ranges taught in the prior art and the claims is sufficient to establish a *prima facie* case of obviousness (MPEP § 2144.05 Section I). It is also possible for the solids to have a concentration in the slurry of between 40% and 50% in order to enable easy feeding of the slurry into the reactor (col. 9, lines 31-35), which converts to a 1.5:1 and 1:1 liquid-to-solid ratio, respectively. Any extra heat produced by exothermic reactions may be harvested to run other processes (col. 2, lines 11-15).

Still regarding claims 37-39, with regard to the absence of the formation of elementary slurry during the neutralizing step, Schneider et al. teach that the exiting slurry from the neutralization step "can contain" sulfur (col. 8, lines 39-43), but does not teach that it necessarily must form. Therefore, Schneider et al. still teach all the claim limitations. In addition, it is established that sulfur-containing compounds are hazardous to the health of humans and animals as well as the environment. Therefore, it would have been obvious to one of ordinary skill in the art to minimize or totally eliminate the formation of sulfur in the neutralization step because of its toxicity and negative effects on the environment.

Regarding claim 45, the NO formed in the oxidation reaction is contacted with oxygen to produce higher oxides of nitrogen having chemical formula N_xO_y (col. 2, lines 38-42). In the case that x and y are 2 and 3, respectively, the higher oxide of nitrogen would be N_2O_3.

Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider et al. (US 4,834,793) in view of Somers et al. (US 2,315,988).

Regarding claims 40 and 41, Schneider et al. teach that NO is formed from the oxidation reaction together with sulfuric acid (col. 3, lines 45-50). Therefore, the NO is already in contact with sulfuric acid. Schneider et al., however, do not teach denitrating the sulfuric acid thermally or chemically. Somers et al. teach that sulfuric acid having a concentration greater than 85% (claim 1) can be denitrated by the addition of ferrous sulphate and heating the mixture to a temperature of up to 100°C (col. 1, lines 53-55 to

col. 2, lines 1-3; col. 3, line 55 to col. 4, lines 1-4), which lies within the claimed range. Somers et al. also disclose that reducing agents aid in the removal of nitrogen oxide from sulfuric acid solutions (col. 1, lines 6-10). Sulfuric acid is used in scrubbing gases and is ideally free of nitrogen oxides due to their corrosive properties (col. 3, lines 5-13). Therefore, it would have been obvious to one of ordinary skill in the art to denitrate the sulfuric acid in Schneider et al. using the process of Somers et al. because of the corrosiveness of nitrogen oxide compounds.

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider et al. (US 4,834,793) in view of Kamiyama et al. (US 4,999,173).

Regarding claim 42, Schneider et al. do not teach absorbing nitrogen in a copper salt solution and denitrating said solution. Kamiyama et al. teach a copper-containing zeolite catalyst for decomposing nitrogen oxides. The catalyst may be made from any water-soluble copper salt, including salts containing monovalent copper (Kamiyama et al., col. 3, 28-30, 44-45). Nitrogen oxide is decomposed when the catalyst has a temperature between 200^{o}C and 1000^{o}C (Kamiyama et al., col. 4, lines 59-62). Because Kamiyama et al. do not teach denitration in a vacuum, the process is interpreted to occur in ambient atmospheric conditions (air). Although the copper on the catalyst is in the solid phase, one of ordinary skill in the art would expect the solution form of copper to be able to decompose nitrogen oxide because the solution phase would have the same chemical makeup as the solid phase. The decomposition of nitrogen oxides is desirable because they are polluting agents that have deleterious

effects on the environment (Kamiyama et al., col. 1, lines 12-17). Thus, it would be obvious to one of ordinary skill in the art to incorporate the catalyst of Kamiyama et al. into the process of Schneider et al. in order to remediate the harmful nitrogen oxide gas produced in the hydrometallurgical process of Schneider et al.

Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider et al. (US 4,834,793) in view of Kamiyama et al. (US 4,999,173), and further in view of Kawasumi et al. (US 4,450,188).

Regarding claims 43 and 44, Schneider et al. in view of Kamiyama et al. teach that ammonia molecules on the catalyst act to reduce bivalent copper to monovalent copper (Kamiyama et al., col. 4, lines 15-22), but do not teach the specific claimed reducing agents. However, hydrazine, one of the claimed reducing agents, is known in the art as a reducing agent, as evidenced by Kawasumi et al., wherein aqueous hydrazine is added to copper powder in order to prevent the copper from oxidizing (col. 7, lines 7-13). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a reducing agent such as hydrazine in the process of Schneider et al. in view of Kamiyama et al. because hydrazine prevents the formation of oxides, as taught by Kawasumi et al., thereby allowing the copper surface to be free of contaminants and available for catalytic use.

Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schneider et al. (US 4,834,793) in view of Frankiewicz et al. (US 4,132,758).

Regarding claim 46, Schneider et al. does not teach regenerating N_2O_3 in an individual regeneration oxidizer. Frankiewicz et al., drawn to a process of obtaining valuable metal from ore, teach oxidizing sulfidic ore and producing nitric oxide (NO) (col. 3, lines 55-57). The nitric oxide is then oxidized either in-situ or in a separate vessel (Frankiewicz et al., col. 4, lines 25-32). It may be advantageous to choose the latter oxidizing environment because the heat generated in the oxidation of NO can be recovered and used to heat other liquors in the process (Frankiewicz et al., col. 4, lines 32-39). Recovering the extra heat generated in the reaction would lower the temperature of the vessel to around room temperature. Therefore, it would have been obvious to one of ordinary skill in the art to recover all the thermal energy generated by the oxidation reaction in the process of Schneider et al. in order to feed heat to other steps in the metal recovery process, as taught by Frankiewicz et al. Reusing heat conserves energy and makes the metal recovery process more efficient.

Response to Arguments

Applicant's arguments with respect to claims 1-36 are moot in view of Applicant's cancellation of those claims.

Applicant's arguments, with respect to claims 37-46, amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. The remarks are therefore not persuasive.

Conclusion

Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Velasquez whose telephone number is (571)270-3587. The examiner can normally be reached on Monday-Friday 8:30 AM-6:00 PM ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached at 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

/Vanessa Velasquez/
Examiner, Art Unit 1793